TRANSITION networks

100BASE-TX to 100BASE-FX
Standard and Extended Temperature Media Converters
E-100BTX-FX-05
USER'S GUIDE

E-100BTX-FX-05 series Ethernet™ 100BASE-TX to 100BASE-FX Media Converters connect 100 Mb/s copper cable to 100 Mb/s fiber cable.

The Media Converters with the "HT" extension in the part number can be put into service in an extended temperature environment from -25°C to 70°C (-13°F to 149°F).

E-100BTX-FX-05 **E-100BTX-FX-05 (HT)**	*Provides an RJ-45 twisted pair 100BASE-TX connector and a set of RX (receive) and TX (transmit)* **ST** *100BASE-FX connectors to* **1300 nm multimode** *fiber-optic cable.*
E-100BTX-FX-05 (SC) **E-100BTX-FX-05 (SCHT)**	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **SC** *100BASE-FX connector to* **1300 nm multimode** *fiber-optic cable.*
E-100BTX-FX-05 (MT)	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **MT-RJ** *100BASE-FX connector to* **1300 nm multimode** *fiber-optic cable.*
E-100BTX-FX-05 (SM) **E-100BTX-FX-05 (SMHT)**	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **SC** *100BASE-FX connector to* **1300 nm singlemode** *fiber-optic cable.*
E-100BTX-FX-05 (SMLC)	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **LC** *100BASE-FX connector to* **1300 nm singlemode** *fiber-optic cable.*
E-100BTX-FX-05 (LH) **E-100BTX-FX-05 (LHHT)**	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **SC** *100BASE-FX connector to* **1300 nm singlemode** *fiber-optic cable.*
E-100BTX-FX-05 (XL) **E-100BTX-FX-05 (XLHT)**	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **SC** *100BASE-FX connector to* **1300 nm singlemode** *fiber-optic cable.*
E-100BTX-FX-05 (LW) **E-100BTX-FX-05 (LWHT)**	*Provides an RJ-45 twisted pair 100BASE-TX connector and an RX (receive) and TX (transmit)* **SC** *100BASE-FX connector to* **1550 nm singlemode** *fiber-optic cable.*

E-100BTX-FX-05 IN THE NETWORK

Use the Media Converter (or two Media Converters in pairs) to connect a workstation to a remote hub or to connect two hubs, switches, or workstations.

TRANSITION Networks E-100BTX-FX-05 100BASE-TX to 100BASE-FX Media Converters connect 100BASE-TX Ethernet™ copper cable to 100BASE-FX Ethernet™ fiber cable.
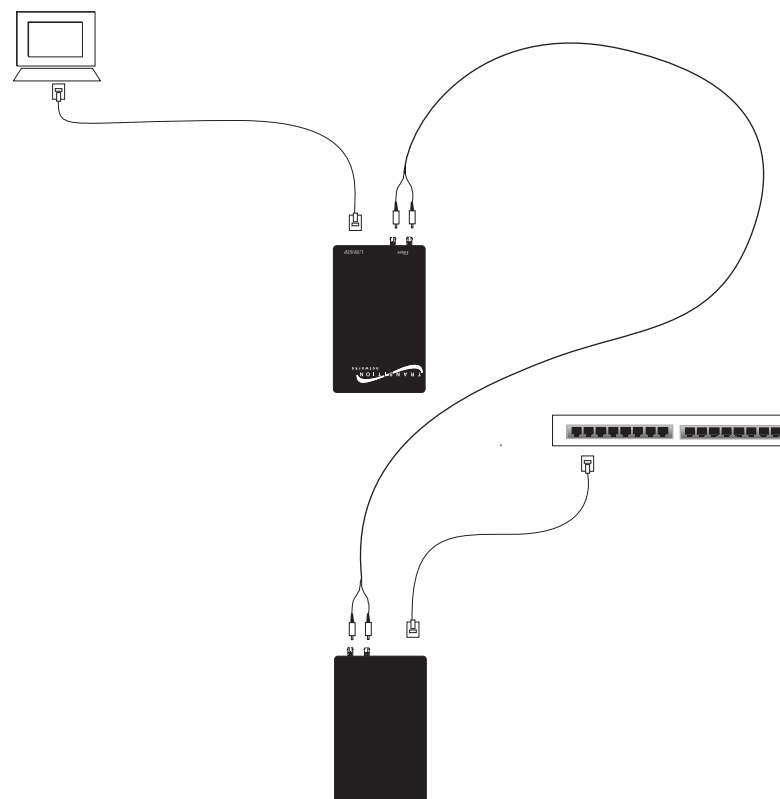
The default copper connection to the Media Converter is autocrossed, so that either straight-through or crossover cable can be used when connecting the Media Converter through twisted-pair copper to a device. (NOTE: An internal jumper allows the autocross feature to be disabled.)

A four-position switch allows selection of autonegotiation, of half-duplex or full-duplex, and of fault detection/handling.

INSTALLATION

CAUTION: Wear a grounding device and observe electrostatic discharge precautions when modifying Media Converter jumper settings. Failure to observe this caution could result in damage to, and subsequent failure of, the Media Converter.

Optionally Modify Two-Position Jumper Settings

The **AUTOCROSS ENABLED/AUTOCROSS DISABLED Jumper J3** is located on the Media Converter internal circuit board *(labeled J3 in the figure below)*. The Media Converters are shipped with the default jumper setting **ENABLE AUTOCROSS**, as shown.

THE JUMPER SETTINGS SHOULD ONLY BE CHANGED IF THE SITE REQUIRES THE JUMPER SETTINGS BE SET TO **DISABLE AUTOCROSS**.

Jumper J3 -- *Enables/disables **AUTOCROSS** function.*

J 3
ENABLE AUTOCROSS

J 3
DISABLE AUTOCROSS
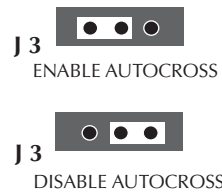
ENABLE AUTOCROSS When *Jumper J3 is in the enabled (DEFAULT) position,* either straight-through or crossover cable can be used when connecting the Media Converter through twisted-pair copper to a device. AutoCross™ determines the characteristics of the cable connection and automatically configures the Media Converter to link up with the attached device.

DISABLE AUTOCROSS When *Jumper J3 is in the disabled position,* straight-through or crossover cables must be selected and installed according to the device connected to the Media Converter**.** (See cable specifications on pages 9 and 10.)

To set the two-position jumper:

1. Using a small screwdriver, remove the four (4) screws that secure the cover to the Media Converter.

2. Carefully remove the cover from the Media Converter.

3. Locate the two-position jumper on the circuit board.

4. Using small needle-nosed pliers or similar device, move the jumper to the desired position. (Refer to the above drawing.)

5. Carefully replace the cover on the Media Converter.

6. Replace the four (4) screws that secure the cover to the Media Converter.

INSTALLATION (continued)

Optionally Set the Four-Position Switch

The Four-Position Switch is located on the side of the Media Converter.

Autonegotiation UP=FULL
Pause UP=ON
LPT UP=ON
FEF UP=ON
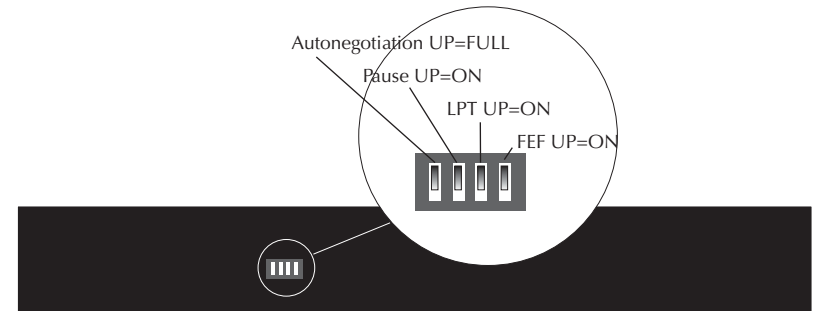
FOUR-POSITION SWITCH SETTINGS

AUTONEGOTIATION:

(UP) Advertises 100 Mb/s full-duplex only during autonegotiation.

(DOWN) (Used primarily when connecting to a hub.) Operates at 100 Mb/s in duplex mode of the attached device.

PAUSE:

(UP) Allows Pause Control Frame propagation.

(DOWN) Does not allow Pause Control Frame propagation.

(Applies only if the full-duplex Switch 1 is UP and the Media Converter is connected to autonegotiating device(s) capable of Pause Control Frame propagation -- See page 7.)

LPT:

(UP) Enables Link Pass-Through. (See page 7.)

(DOWN) Disables Link Pass-Through.

FEF:

(UP) Enables Far-End Fault. (See page 7.)

(DOWN) Disables Far-End Fault.

TO SET THE FOUR-POSITION SWITCH:

1. Locate the four-position switch on the side of the Media Converter.

2. Using a small, flatblade screwdriver or a similar device, set the switch according to site the requirements (see above drawing).

Install Cable

FIBER

1. Locate or build an IEEE 802.3™ compliant fiber cable with male two-stranded TX to RX connectors installed at both ends.

2. Connect the cable with the connector installed at the TX location on the Media Converter to the RX location on the attached device.

3. Connect the cable with the connector installed at the RX location on the Media Converter to the TX location on the attached device.
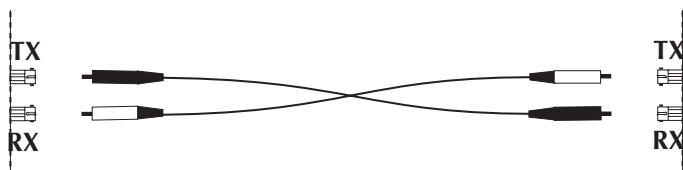
COPPER

NOTE: Do NOT exceed 100 meters distance on the twisted-pair cable runs.

1. Locate or build an IEEE 802.3™ compliant straight-through* twisted-pair copper cables (if the default autocross jumper configuration is used), with male RJ-45 plug connectors at both ends.

   *If the default autocross jumper configuration (see page 3) is NOT used, install a crossover twisted-pair copper cable between the Media Converter and a terminal device and install a straight-through twisted-pair copper cable between the Media Converter and a hub.

2. Connect the male RJ-45 plug connector at one end of the cable to the Media Converter RJ-45 jack connector.

3. Connect the male RJ-45 plug connector at the other end of the cable to the DTE terminal device or hub RJ-45 jack connector.

Power the Media Converter

1. Install the Power Adapter cord to the back of the Media Converter.

2. Connect the Power Adapter 3-prong plug to AC power.

3. Verify that the Media Converter is powered by observing the illuminated LED(s).

OPERATION

After installation, the Media Converter should function without operator intervention.

Status LEDs

Use the status LEDs to monitor Media Converter operation in the network.
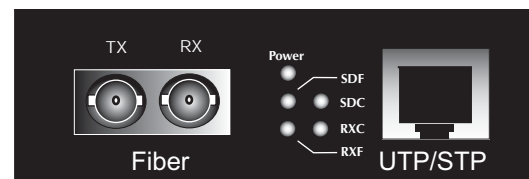
Power	Illuminated green LED indicates connection to external AC power.
SDF	Signal Detect/Fiber: Steady green LED indicates the fiber port is connected to the device.
SDC	Signal Detect/Copper: Steady green LED indicates the RJ-45 twisted-pair copper port is connected to the device.
RXC	Receive/Copper: Flashing green LED indicates the packets are seen on the twisted-pair copper RJ-45 port.
RXF	Receive/Fiber: Flashing green LED indicates the packets are seen on the fiber port.

Pause Control Frame

When both ends of a full-duplex media coverter link are able to send and receive Pause Control Frames AND the Media Converter four-position switch is set to allow Pause Control Frame propagation (see page 4), then the Pause Control Frame feature can improve network performance by allowing one end of the link to signal the other to discontinue frame transmission for a set period of time to relieve buffer congestion.

Link Pass-Through

When the Media Converter four-position switch is set to allow Link Pass-Through (see page 4), then a fault on one side of the media coverter stops signal and data transmission on the other side.
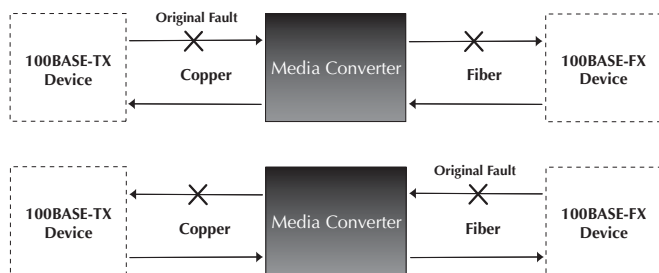
Far-End Fault

When the Media Converter four-position switch is set to *enable* Far-End Fault (see page 4), then a fault on an incoming fiber link causes the Media Converter to transmit a Far-End Fault signal on the outgoing fiber link.
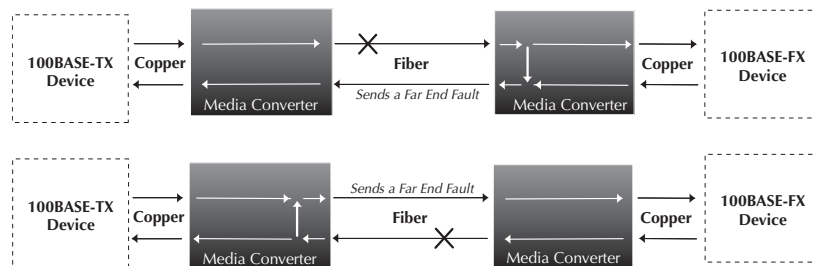
FAULT ISOLATION and CORRECTION

If the Media Converter fails, isolate and correct the failure by determining the answers to the following questions and then taking the indicated action:

1. **Is the *Power* LED on the Media Converter illuminated?**

   NO

   - Is the power adapter the proper type of voltage and cycle frequency for the AC outlet?
     NOTE: Refer to the "Power Supply Requirements" on page 11.
   - Is the power adapter properly installed in the Media Converter and in the outlet?
   - Contact Technical Support at (800) 260-1312.

   YES

   - Proceed to step 2.

2. **Is the *SDC* (Signal Detect/Copper) LED illuminated?**

   NO

   - Check the UTP cables for proper connection.
   - Contact Technical Support at (800) 260-1312.

   YES

   - Proceed to step 3.

3. **Is the *SDF* (Signal Detect/Fiber) LED illuminated?**

   NO

   - Check the fiber cables for proper connection.
   - Verify that the TX and RX cables on the Media Converter are connected to the RX and TX ports, respectively, on the other 100BASE-FX device.
   - Refer to the Tech Tips available at: http://www.transition.com
   - Contact Technical Support at (800) 260-1312.

   YES

   - Contact Technical Support at (800) 260-1312.

CABLE SPECIFICATIONS

The physical characteristics of the media cable must meet or exceed IEEE 802.3™ specifications.

Fiber Cable

Bit error rate: $<10^{-9}$

MULTIMODE

Fiber Optic Cable Recommended: 62.5 / 125 μm multimode fiber
Optional: 100 / 140, 85 / 125 , 50 / 125 μm multimode fiber

E-100BTX-FX-05
E-100BTX-FX-05 (HT)
E-100BTX-FX-05(SC)
E-100BTX-FX-05(SCHT)

E-100BTX-FX-05(MT)	1300 nM	
Fiber Optic Transmitter Power:	min: -19.0 dBm	max: -14.0 dBm
Fiber Optic Receiver Sensitivity:	min: -30.0 dBm	max: -14.0 dBm
Link Budget:	11.0 dB	
Typical Maximum Cable Distance*:	2 kilometers	

E-100BTX-FX-05(SMHT)	1300 nM	
Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm
Link Budget:	16.0 dB	
Typical Cable Distance*:	20 kilometers	

SINGLEMODE

Fiber Optic Cable Recommended: 9 μm singlemode fiber

E-100BTX-FX-05(SM)	1300 nM	
Fiber-optic Transmitter Power:	min: -15.0 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -31.0 dBm	max: -8.0 dBm
Link Budget:	16.0 dB	
Typical Cable Distance*:	20 kilometers	

E-100BTX-FX-05(SMLC)	1300 nM	
Fiber-optic Transmitter Power:	min: -15.2 dBm	max: -8.0 dBm
Fiber-optic Receiver Sensitivity:	min: -32.5 dBm	max: -3.0 dBm
Link Budget:	17.3 dB	
Typical Cable Distance*:	20 kilometers	

E-100BTX-FX-05(LH)

E-100BTX-FX-05(LHHT)	1300 nM	
Fiber-optic Transmitter Power:	min: -8.0 dBm	max: -2.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	8 dB	
Typical Cable Distance*:	26 kilometers	

*Actual distance dependent upon physical characteristics of network installation.

MDI Fault   Steady LED for 5-10 seconds indicates the POE sources exceed approximately 0.4 A of current on the MDI interface.

CABLE SPECIFICATIONS (continued)

SINGLEMODE (Continued)

E-100BTX-FX-05(XL)	1300 nM	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	7 dB	
Typical Cable Distance*:	60 kilometers	

E-100BTX-FX-05(XLHT)	1300 nM	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: -0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	29.0 dB	
Typical Cable Distance*:	60 kilometers	

E-100BTX-FX-05(LWHT)	1300 nM	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: -0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	29.0 dB	
Typical Cable Distance*:	80 kilometers	

E-100BTX-FX-05(LW)	1550 nM	
Fiber-optic Transmitter Power:	min: -5.0 dBm	max: 0.0 dBm
Fiber-optic Receiver Sensitivity:	min: -34.0 dBm	max: -7.0 dBm
Link Budget:	7 dB	
Typical Cable Distance*:	80 kilometers	

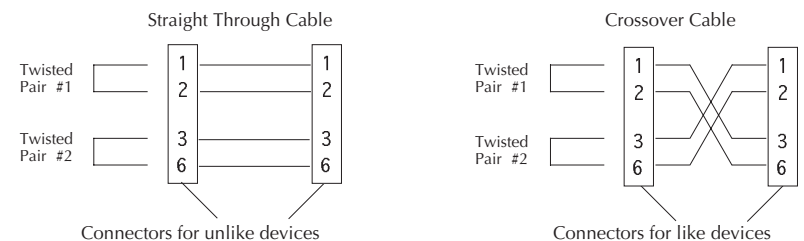*Actual distance dependent upon physical characteristics of network installation.

Copper Cable

Category 5 shielded twisted-pair (STP) or unshielded twisted-pair (UTP) copper wire is required. DO NOT USE FLAT OR SILVER SATIN WIRE.

CATEGORY 5:

Gauge	24 to 22 AWG
Attenuation	22.0 dB /100m @ 100 MHz
Maximum Cable Distance:	100 meters
RJ-45 Pin-out:	Pin 1=TD+, Pin 2=TD-, Pin 3=RD+, Pin 6=RD-

The two active pairs in a 100BASE-TX network are pins 1 & 2 and pins 3 & 6. Use only dedicated wire pairs (such as blue/white & white/blue, orange/white & white/orange) for the active pins.

Straight Through Cable   Crossover Cable

Twisted Pair #1   1 2   1 2
Twisted Pair #2   3 6   3 6

Connectors for unlike devices   Connectors for like devices

TECHNICAL SPECIFICATIONS

Standards	IEEE 802.3	
Case Dimensions	4.75" x 3.0" x 1.0"	(119mm x 76mm x 25mm)
Shipping Weight	3 pounds	(1.4 kilograms)
Environment	Storage Temperature	-20 to 85°C
	Humidity	10-90%, non condensing
	Altitude	0-10,000 feet
	Temperature	0-50°C (32° to 122° F)

E-100BTX-FX-05, E-100BTX-FX-05(SC), -(MT), -(SM),
-(SMLC), -(LH), - (XL), -(LW)

	Temperature	-25 to 65°C (-13° to 149°F)

E-100BTX-FX-05(HT), -(SMHT), -(LHHT), -(XLHT),
-(LWHT), -(SCHT)

Power Supply Requirements Replace power supply with only the equivalent input rating (see below) and output rating (regulated 9VDC at 550 mA).

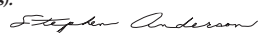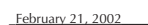*E-100BTX-FX-05, E-100BTX-FX-05(SC), -(MT), -(SM), -(SMLC), -(LH), - (XL), -(LW)*

TN PN	Requirement	Location
25034 or 3525	240 volts, 50 hz	United Kingdom
25034 or 3525	230 volts, 50 hz	Europe
3518	120 volts, 60 hz	USA/Canada/Mexico
3514	100 volts, 50-60 hz	Japan
25034 or 3525	240 volts, 50 hz	Australia

E-100BTX-FX-05(HT), -(SMHT), -(LHHT), -(XLHT), -(LWHT), -(SCHT)

TN PN	Requirement	Location
25039	120 volts, 60 hz	USA/Canada/Mexico
25040	100-240V, 50-70hz	Rest of World

Note: This product can be powered by the E-MCR series Media Converter Rack.

Warranty	Lifetime

DECLARATION OF CONFORMITY

T R A N S I T I O N
networks

Name of Mfg:	**Transition Networks**
	6475 City West Parkway, Minneapolis MN 55344 USA
Model:	**E-100BTX-FX-05(xxxx) Series Media Converters**
Part Number(s):	**E-100BTX-FX-05, E-100BXT-FX-05(HT), E-100BTX-FX-05(SC), E-100BTX-FX-05(SCHT),**
	E-100BTX-FX-05(MT), E-100BTX-FX-05(SM), E-100BTX-FX-05(SMHT),
	E-100BTX-FX-05(SMLC), E-100BTX-FX-05(LH), E-100BTX-FX-05(LHHT), E-100BTX-FX-05(XL),
	E-100BTX-FX-05(LXHT), E-100BTX-FX-05(LW), E-100BTX-FX-05(LWHT)
Regulation:	**EMC Directive 89/336/EEC**

Purpose: To declare that the **E-100BTX-FX-05(xxxx)** to which this declaration refers is in conformity with the following standards.

EN 55022: 1994 Class A; EN 55024:98; UL 1950, 3rd Edition

I, the undersigned, hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s).

Stephen Anderson
Stephen Anderson, Vice-President of Engineering

February 21, 2002
Date

COMPLIANCE INFORMATION

UL Listed
C-UL Listed (Canada)
CISPR22/EN55022 Class A + EN55204
CE Mark

FCC Regulations

This equipment has been tested and found to comply with the limits for a class A digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at the user's own expense.

Canadian Regulations

This digital apparatus does not exceed the Class A limits for radio noise for digital apparatus set out on the radio interference regulations of the Canadian Department of Communications. Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la class A prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

European Regulations
Warning
This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
Achtung !
Dieses ist ein Gerät der Funkstörgrenzwertklasse A. In Wohnbereichen können bei Betrieb dieses Gerätes Rundfunkstörungen auftreten, in weichen Fällen der Benutzer für entsprechende Gegenmaßnahmen werantwortlich ist.
Attention !
Ceci est un produit de Classe A. Dans un environment domestique, ce produit risque de créer des interférences radioélectriques, il appartiendra alors à l'utilsateur de prende les measures spécifiques appropriées.

CAUTION: RJ connectors are NOT INTENDED FOR CONNECTION TO THE PUBLIC TELEPHONE NETWORK. Failure to observe this caution could result in damage to the public telephone network.

Der Anschluss dieses Gerätes an ein öffentlickes Telekommunikationsnetz in den EG-Mitgliedstaaten verstösst gegen die jeweligen einzelstaatlichen Gesetze zur Anwendung der Richtlinie 91/263/EWG zur Angleichung der Rechtsvorschriften der Mitgliedstaaten über Telekommunikationsendeinrichtungen einschliesslich der gegenseitigen Anerkennung ihrer Konformität.

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